

# North Windham Quadrangle, Maine

Surficial geologic mapping by

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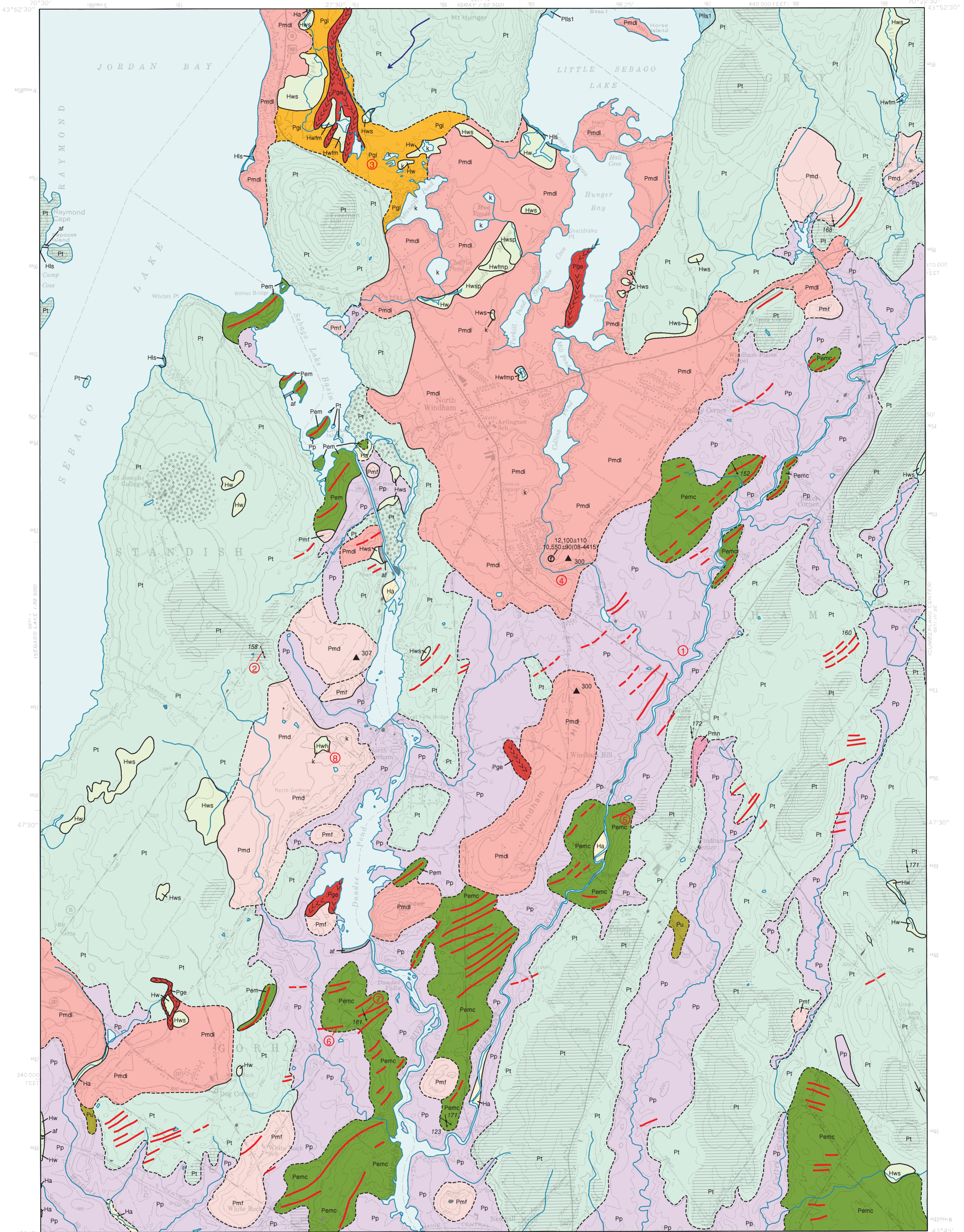
## Maine Geological Survey

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For additional information,  
see Open-File Report 97-75.

# Surficial Geology

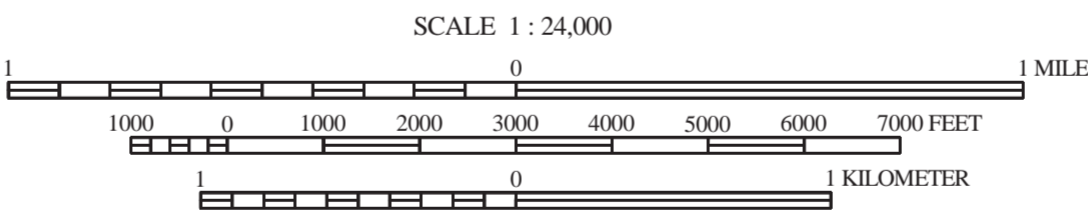


### SOURCES OF INFORMATION

Surficial geologic mapping by Andr  e M. Bolduc and Andres Meglioli completed during the 1988 field season; funding for this work provided by the U.S. Geological Survey COGEMAP program. Woodrow B. Thompson conducted additional surficial geologic field work during the 1976 and 1991 field seasons, funded by the Maine Geological Survey.



Quadrangle Location



SCALE 1 : 24,000

CONTOUR INTERVAL 20 FEET

### USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

### OTHER SOURCES OF INFORMATION

- Bolduc, A. M., Thompson, W. B., and Meglioli, A., 1997, Surficial geology of the North Windham 7.5-minute quadrangle, York County, Maine: Maine Geological Survey, Open-File Report 97-75, 7 p.
- Bolduc, A. M., Thompson, W. B., and Meglioli, A., 1998, Surficial materials of the North Windham quadrangle, Maine: Maine Geological Survey, Open-File Map 98-192.
- Neil, C. D., 1998, Significant sand and gravel aquifers of the North Windham quadrangle, Maine: Maine Geological Survey, Open-File Map 98-158.
- Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print).
- Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.
- Thompson, W. B., Crossen, K. J., Borns, H. W., Jr., and Andersen, B. G., 1989, Glaciomarine deltas of Maine and their relation to late Pleistocene-Holocene crustal movements, in Anderson, W. A., and Borns, H. W., Jr. (eds.), Neotectonics of Maine: Maine Geological Survey, Bulletin 40, p. 43-67.

Ha	<b>Stream alluvium</b> - Sand, gravel, and silt deposited on flood plains of modern streams.
Hs	<b>Lacustrine shoreline</b> - Sand and gravel deposited on the shores of modern lakes.
Hw	<b>Wetland</b> - Undifferentiated wetland, underlain by peat, muck, silt, or clay.
Hwh	<b>Wetland, heath</b> - Peat bog deposited in poorly drained area.
Hws	<b>Wetland, swamp</b> - Peat, muck, silt, and clay. Poorly drained area with variable tree cover. Areas labeled "Hwsp" include peat deposits with a probable thickness of at least 5 ft.
Hwfm	<b>Wetland, freshwater marsh</b> - Peat, muck, silt, and clay. Poorly drained grassland; often has standing water. Areas labeled "Hwfm" include peat deposits with a probable thickness of at least 5 ft.
Pmn	<b>Marine nearshore deposits</b> - Sand and gravel eroded from glacial sediments by wave action during late-glacial marine submergence.
Pp	<b>Presumpscot Formation</b> - Massive to laminated, gray to bluish-gray silt and clay. Weathers to brownish-gray. Locally may include minor sand and gravel. Occurs as a blanket deposit over bedrock and older glacial sediments. Deposited on the sea floor during late-glacial marine submergence.
Plls1	<b>Lake deposits</b> - Sand and gravel deposited in a glacial lake in the Little Sebago Lake basin.
Pmd	<b>Glaciomarine delta</b> - Sand and gravel deposited in the sea at the glacier margin during marine submergence. The contact between the topset and foreset beds marks the approximate position of sea level at the time of delta deposition. Locally overlies or is interstratified with the Presumpscot Formation. "Pmnd" indicates deltas formed at the glacier margin.
Pmf	<b>Glaciomarine fan</b> - Sand and gravel deposited in a submarine environment at the margin of the ice sheet during late-glacial time.
Pge	<b>Esker</b> - Sand, gravel, and boulders deposited as ridges in subglacial tunnels during late-glacial time. Eskers commonly are feeders to glaciomarine deltas or fans.
Pu	<b>Glacial or glaciomarine deposit of uncertain origin</b> - May include till, clay, silt, sand, and gravel deposited by glacial or uncertain processes.
Pgl	<b>Ice-contact deposits, undifferentiated</b> - Glacial sand and gravel of ice-contact origin, for which no exposures were available for further classification.
Pemc	<b>End moraine complex</b> - Area of end moraines and associated glaciomarine sediments (submarine fan and sea-floor deposits). Composed of till, sand, and gravel deposited at the margin of the late Wisconsinan ice sheet.

Pem	<b>End moraine</b> - Individual moraine ridge deposited at the glacier margin. Composed of till, sand, and gravel.
Pt	<b>Till</b> - Loose to moderately compact, poorly sorted, weakly to non-stratified mixture of silt, sand, pebbles, cobbles, and boulders deposited by glacial ice. Locally shows hummocky topography.
[Pattern]	<b>Bedrock</b> - Ruled pattern indicates areas where surficial sediments are usually less than 10 ft (3 m) thick. Gray dots show location, and shapes where possible, of outcrops.
af	<b>Artificial fill</b> - Composed of till, sand and gravel, rock, or various man-made materials.
---	<b>Contact</b> - Boundary between map units. Dashed where location is very approximate.
[Dot]	<b>Glacial striation locality</b> - Dot indicates point of observation. Number is azimuth (in degrees) of inferred glacial flow direction shown by arrow. Flagged arrow indicates earlier flow direction.
[Pattern]	<b>Boulders</b> - Used to indicate areas with many large boulders.
---	<b>Moraine ridge</b> - Ridge of till and/or water-laid sediments deposited in the marginal zone of the glacier. Dashed where not clearly defined or inferred from aerial photographs.
▲350	<b>Glaciomarine delta</b> - Number indicates, in feet, the elevation of the contact between foreset and topset beds, which marks the position of corresponding sea level (modified from Thompson and others, 1989).
<<<<<	<b>Esker crest</b> - Shows trend of sand and gravel ridges deposited in meltwater tunnels beneath the glacial ice sheet. Chevrons point in the direction of meltwater flow.
---	<b>Meltwater channel</b> - Channel eroded by glacial meltwater stream. Arrow indicates direction of meltwater flow.
---	<b>Glacially streamlined hill</b> - Indicates long axis of hill that has been molded and elongated parallel to the flow of glacial ice.
---	<b>Fluted till surface</b> - Symbol shows axis of a long narrow ridge carved in till by flow of glacial ice.
k	<b>Kettle</b> - Depression created by melting of a buried mass of glacial ice and collapse of the overlying sediments. May contain a pond or wetland.
10,150±450	<b>Nonmarine fossil locality</b> - Silty-sandy sediments filling kettle in North Windham glaciomarine delta. The sediments contain abundant plant remains. Numbers indicate radiocarbon age of dated sample (in years).
④	<b>Photo locality</b> - Location of photographed site shown and described in map legend.